

REMARKS

Claims 1-30, 33, 38, 39, 42, and 49-56 will be pending upon entry of the present amendment. Claims 9, 12, 13, and 38 have been amended and claims 34-37 are canceled. No new matter is added by the present amendment.

Applicants thank Examiner Beck for indicating the allowability of claims 18-25, and also for his consideration in conducting a telephone interview with the undersigned representative on October 18, 2007, during which the language of the independent claims was discussed.

In particular, with respect to claim 1, the undersigned noted that the Matsumoto reference is directed to an output device, while the Sato reference is directed to an input device, and that a combination of the references would require a change of function of the elements of Matsumoto in order to operate with Sato's input device. Furthermore, it was noted that Matsumoto's motivation for providing brakes on its industrial robot is probably one of safety, inasmuch as such machines can be very large, and may be in operation alongside workers and other equipment. If such a robot were to lose power unexpectedly, it could easily collapse onto workers or expensive equipment. Thus, the brakes are provided that lock the robot in position if power is removed.

For its part, Sato provides solenoid-powered grippers that apply drag to the cables of its input device when power is *applied*, to generate tactile feedback as the user operates in a computer-simulated environment. Sato's device is always in balance, inasmuch as the weights on its cables are of equal value, and is of a size that could sit on a table top. Accordingly, there are no safety concerns related to loss of power. Additionally, by configuring its device to apply drag when power is applied, Sato can easily control the amount of drag that results. A spring for lifting the solenoid plunger needs only have power sufficient to lift the plunger, while drag of varying amounts is applied by applying an appropriate amount of power to the solenoid to overcome the light-duty spring and grip the cable. In contrast, in a system in which drag is

applied when power is removed, the upper limit of the drag that could be applied would be determined by the strength of the spring, which would therefore need to be sufficiently strong to apply the maximum drag that would ever be called for. This would mean that during virtually all normal operation of its device, sufficient power would need to be applied to the solenoid to overcome the spring, and that to apply only a small amount of drag would require that sufficient power be applied to the solenoid to *almost* overcome the relatively very powerful spring. Not only would this result in higher equipment costs and higher power expenditure, it would also result in more difficulty in precisely controlling the drag applied, especially in the lower ranges of applied drag, where all of the power applied would be expended in simply overcoming the spring. Furthermore, unless the strength of the spring was regularly monitored, accurate control of the system would be virtually impossible, inasmuch as it is known that the strength of such springs does not remain constant, but changes over time. Thus, it can be seen that a combination of Matsumoto with Sato would make Sato's system significantly more complex, expensive, less energy efficient, and less accurate, and would also functionally change the operation of Sato's device. Neither Matsumoto nor Sato suggest any advantages to such a modification.

For at least these reasons, applicants believe that such a combination is inappropriate for rejecting claim 1. Applicants understand that the Examiner is in agreement with this reasoning.

Claim 29 recites, in part, "locking, during a shutdown procedure, each of the plurality of cables at the respective anchor point, storing a value indicative of a known length of each of the cables in a memory, and recovering the value indicative of the known length of each of the cables from the memory during a startup procedure." Applicants understand that the Examiner agrees that claim 29 is allowable over the art of record for the reasons outline above with respect to claim 1, as well as because neither reference teaches the storing and recovering acts.

Claim 9 has been amended to recite, in part, "a sensor array associated with the attachment point and configured to provide signals corresponding to at least one of roll, pitch,

and yaw of the tool”; claim 12 recites, in part, “a user interface tool configured to be manipulated by the user and moved within a volume of space, and including a sensor array configured to detect at least one of roll, pitch, and yaw of the user interface tool”; and claim 38 recites, in part, “measuring at least one of roll, pitch, and yaw of the tool by receiving a signal from a sensor operatively coupled to the tool.” The amendments are fully supported in the specification, and the terms *roll*, *pitch*, and *yaw* are commonly understood to refer to changes of orientation of an object around three mutually perpendicular axes that lie within the object. In rejecting the claims, the Office Action noted that Sato’s system can detect or measure an orbit of its instruction point around an axis outside of itself, and on this basis can “rotate,” as originally recited in claim 12. However, Sato does not teach or suggest detection of roll, pitch, or yaw of the instruction point. With these amendments, applicants understand that claims 9, 12, and 38 are distinguishable over the art of record.

Applicants have agreed to cancel claims 34-37 in order to move the application toward allowance.

In view of the allowability of the independent claims as discussed above, the rejections of the dependent claims are moot, and so will not be discussed. This is not to be construed as an admission that such claims would not be allowable but for their dependence on allowable base claims. If the undersigned representative has overlooked a relevant teaching in any of the references, the Examiner is requested to point out specifically where such teaching may be found.

Finally, Applicants understand that, in view of the extent of agreement reached on the claims, and the limited scope of the amendments, that the Examiner has agreed to enter the amendment into the record.

In light of the above amendments and remarks, Applicants respectfully submit that all pending claims are now in condition for allowance, and therefore request that the Examiner reconsider this application and timely allow all pending claims. Examiner Beck is encouraged to contact Mr. Bennett by telephone at (206) 694-4848 to discuss the above and any

other distinctions between the claims and the applied references, and to address any informalities that may remain unresolved.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

Respectfully submitted,
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